of the Murghab. To the north-west both rivers are lost in the sands of the desert. The Hari-Rud is crossed by a bridge ninety-seven yards long. From this point it was formerly a distance of ninety kilometres to the nearest fresh water, but this has been diminished to forty-eight kilometres by a canal constructed by Colonel Alikhanoff during the past season. This diverts part of the water of the Murghab, but it was found impracticable to extend it further. The latter river, unlike the Hari-Rud, does not dry up, but carries in winter seventy-five cubic metres per second as against three hundred in summer. It contains about two per cent of earthy matter, amounting, for the annual epoch of floods, to about fifty million cubic metres of mud, which is spread by the innumerable irrigating canals over the surface of the Merv oasis. The destruction in 1784, of the great dike of Sultan Bend, much diminished the irrigated and fertile area. The Russian government has reserved sixty thousand rubles to rebuild this dike, and it is expected that nearly four hundred thousand acres will be reclaimed by this work, and, in time, nearly four times as much more. This land, when irrigated, is of extreme fertility, wheat producing a crop of one hundred bushels for every bushel sown. Merv is growing rapidly: town lots of a certain size are given away, on condition that the receiver builds upon them at once. The streets are wide, with broad footwalks, planted with trees, and bordered with small canals. The oasis is confidently expected to develop largely in the near future.

PHOTOGRAPHIC STUDY OF STELLAR SPECTRA.

THE study of stellar spectra by means of photography was one of the most important investigations undertaken by the late Prof. Henry Draper. He was actively engaged in this research during the last years of his life. His plans included an extensive investigation, one object of which was to catalogue and classify the stars by their spectra. Mrs. Draper has made provision, at the observatory of Harvard college, for continuing these researches as a memorial to her husband. The results already obtained, with the aid of an appropriation from the Bache fund, permit the form of the new investigation to be definitely stated. The part of the sky to be surveyed is that extending from the north pole to the parallel of thirty degrees south declination. Each photograph will be exposed for about one hour, and will include a region ten degrees square. The telescope employed has an aperture of twenty centimetres (eight inches), and a focal length of a hundred and seventeen centimetres (forty-four inches). The object-glass is covered by a prism, and the resulting spectrum of each star in the region photographed has a length of about one centimetre, which enables the character of the spectra of stars from the fifth to the eighth magnitude to be determined. A modification of the apparatus is employed for the brighter stars.

Meanwhile, experiments are in progress with the fifteen-inch equatorial, with the object of representing the spectra of some typical stars upon a large scale. The spectra so far obtained are about six centimetres in length, and exhibit much well-defined detail. Additional experiments will be tried with a spectroscope provided with a slit, as well as with the simple prism hitherto employed, in order to secure the best possible definition. The present results encourage the expectation that the movements of stars in the line of sight may be better determined by the photographic method than by direct observations.

To keep the astronomical public informed of the progress made in this work, specimens of the photographs obtained will be gratuitously distributed from time to time. The first of these distributions will probably be made in a few weeks. Owing to the expense of providing a large number of copies, it is desirable to limit the distribution, so far as possible, to those who are interested in this class of work. It is also desired, however, to send the specimens to all who will find them of value from the scientific point of view. Requests should be sent to the Harvard college observatory by any one desirous of receiving the specimens. EDWARD C. PICKERING.

THE HUDSON BAY ROUTE TO EUROPE.

LAST year there appeared in *Science* (vol. v. No. 110) an account of the Hudson Bay expedition of 1884, accompanied by a track-chart showing the route followed. Lieutenant Gordon's official report of his last summer's trip to the bay, to relieve the observers at the stations established in the strait in 1884, is included in the annual report of the Canadian department of marine, lately submitted to the Dominion parliament. It is in narrative form, and contains little new information, the results of the observations conducted at the several stations being reserved for publication as a separate report so soon as they shall have been reduced to proper form.

Lieutenant Gordon, after promising details of the observations at an early date, concludes his report with the following remarks on the prospects of navigating the strait: "The reports go to show that the ice set fast in the western end of